Conway's Game of Life

Introduction

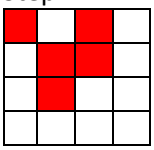
The goal is to implement Conway's The Game of Life (a cellular automaton devised by the British mathematician John Horton Conway in 1970).

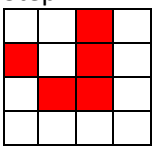
Game of Life Rules

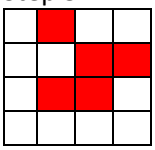
The universe of the Game of Life is a two-dimensional grid of square cells, each of which is in one of two possible states, alive or dead. Every cell interacts with its eight neighbors, which are the cells that are horizontally, vertically, or diagonally adjacent. At each step in time, the following transitions occur:

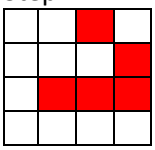
1. Any **live cell** with **fewer than two** live neighbors **dies**, as if caused by under-population.
2. Any **live cell** with **two or three** live neighbors **lives** on to the next generation.
3. Any **live cell** with **more than three** live neighbors **dies**, as if by overcrowding.
4. Any **dead cell** with **exactly three** live neighbors **becomes a live cell**, as if by reproduction.

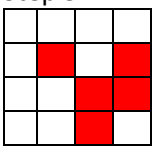
The initial pattern constitutes the seed of the system. The first generation is created by applying the above rules simultaneously to every cell in the seed—births and deaths occur simultaneously, and the discrete moment at which this happens is called a tick. The rules continue to be applied repeatedly to create further generations.

Step 1 

Step 2 

Step 3 

Step 4 

Step 5 

Implementation Details

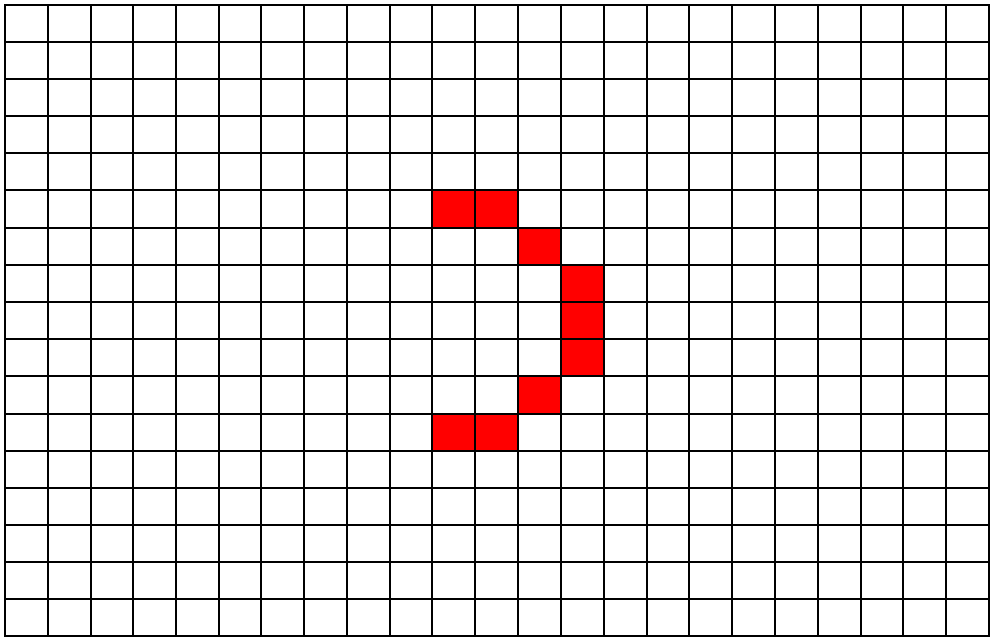
- The grid must be 50 cells width and 50 cells height
- Frequency of game loop is 30 Hz (30 ticks per second)
- All public methods and classes must be well documented (commented)
- There are three different initial patterns that are used as first a generation of cells (see Initial Patterns section)
- Pressing Enter on the keyboard restart the simulation and starts it from another pattern (next from the list)

Initial patterns

1. Random Pattern

Every cell is random. There are 50% of alive and 50% of dead cell.

2. The Queen Bee Shuttle Pattern



3. Tumbler Pattern